

ABSTRACT OF THE DISCLOSURE

Video communication over lossy packet networks such as the Internet is hampered by limited bandwidth and packet loss. The present invention provides a system for providing reliable video communication over these networks, where the system includes at least two jointly designed subsystems: (1) multiple state video coding system and (2) path diversity transmission system. Multiple state video coding combats the problem of error propagation that results from packet loss by coding the video into multiple independently decodable streams, each with its own prediction process and state. If one stream is lost the other streams can still be decoded to produce usable video, and furthermore, the correctly received streams provide bidirectional (i.e., previous and future) information that enables improved state recovery for the corrupted stream. The path diversity transmission system explicitly sends different subsets of packets over different paths, as opposed to the prior art approaches where the packets proceed along a single path. By explicitly sending different subsets of packets over different paths, the path diversity transmission system enables the end-to-end video application to effectively see an average path behavior, which is referred to herein as path diversity. Generally, seeing this average path behavior provides better performance than seeing the behavior of any individual random path. The resulting path diversity provides the multiple state video decoder with an appropriate virtual channel to assist in recovering from lost packets, and can also simplify system design (e.g., forward error correction design).